Jan. 13, 1942. W. C. POTTHOFF 2,269,685

DIAPHRAGM

Filed June 5, 1936 2 Sheets-Sheet 1

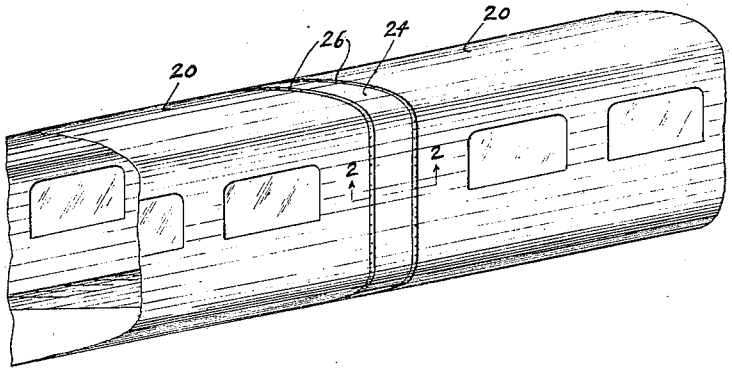



Fig. 1

Fig. 2

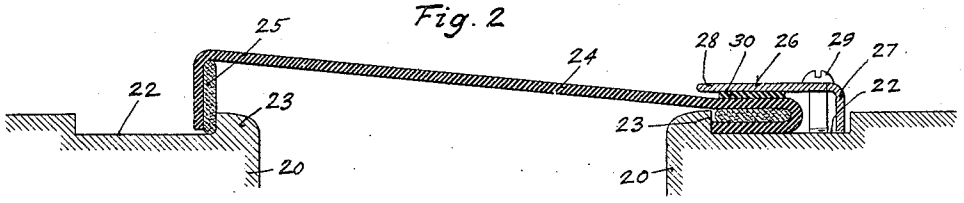
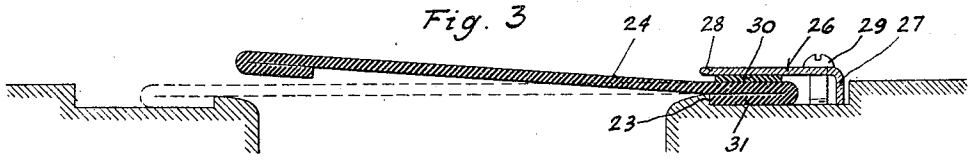



Fig. 3



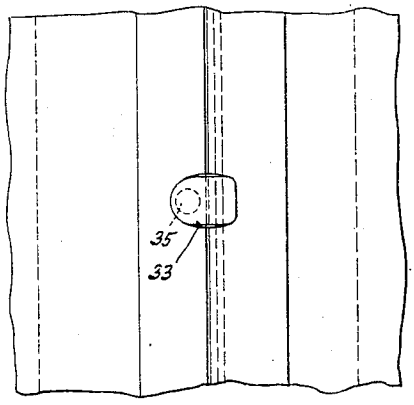




Fig. 5

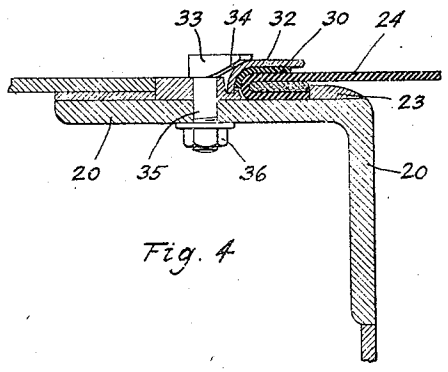



Fig. 4

Inventor

WILLIAM C. POTTHOFF

By

Attorney

Jan. 13, 1942. W. C. POTTHOFF 2,269,685

DIAPHRAGM

Filed June 5, 1936 2 Sheets-Sheet 2

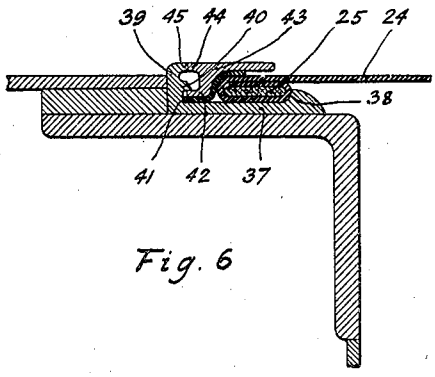



Fig. 6

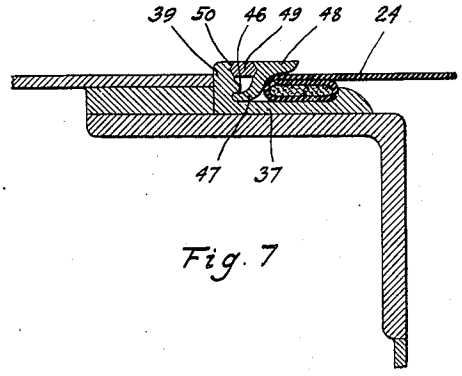



Fig. 7

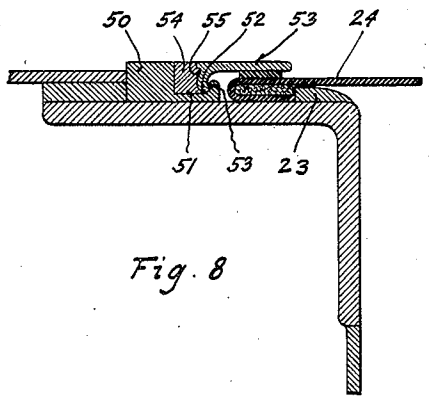



Fig. 8

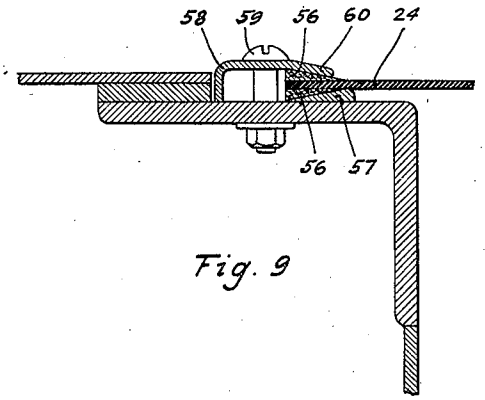



Fig. 9

Inventor

WILLIAM C. POTTHOFF

By

Attorney

Patented Jan. 13, 1942 2,269,685

# UNITED STATES PATENT OFFICE

2,269,685

## DIAPHRAGM

William C. Potthoff, Cuyahoga Falls, Ohio, assignor, by mesne assignments, to Wingfoot Corporation, Akron, Ohio, a corporation of Delaware

Application June 5, 1936, Serial No. 83,687

12 Claims. (Cl. 105—15)

The present invention relates particularly to trains, especially of stream-line construction, and has to do with the stream-lining of the articulated joints between sections of the stream-line train, such as exist between adjacent cars on that train. However, its use is not limited to stream-line trains as it may be well employed for those trains which are not stream-lined, or could be used for stream-lining articulated joints in truck-trailer combinations, etc.

One object of this invention is to provide a flexible diaphragm connected to each end of a car section to bridge the joint therebetween and prevent eddy currents in between the car sections which offer resistance to the forward movement of the train. Due to the fact that the train sections move angularly with respect to each other and also have some relative vertical and lateral movement with respect to each other during movement of the train, a flexible diaphragm is practically essential.

Another object of this invention is to provide a diaphragm which will maintain a substantially continuous unbroken surface forming substantially a continuation of the connected portions of the adjacent car sections so that the air will flow smoothly past the articulated joint of the sections to eliminate eddy currents and the like which impede the forward movement of the train.

Another object of this invention is to provide a diaphragm in sheet form which may be readily and firmly attached to the car ends without the use of special equipment, and particularly to so construct the diaphragm and its fastening means by which it is connected to the train sections that the diaphragm may be initially tensioned without the aid of special equipment or tools.

Another object of this invention is to provide a diaphragm which may be completely formed, for instance at a rubber factory, and ready for application to the train, which diaphragm is so constructed as to be compacted within a relatively small space to decrease the bulk in shipping same.

Another object of this invention is to provide a rubber diaphragm with reenforcing strips at the ends thereof, which ends cooperate with the clamping means to hold the diaphragm in place, these strips preferably being formed of flexible material to enable one to roll the diaphragm into a compact bundle for easy shipping of same.

Another object of this invention is to provide in a stream-line train a rubber diaphragm for connecting articulated train sections with the diaphragm substantially flush with the connected outer surfaces of the train sections and in a simple and efficient manner.

Another object of this invention is to provide a simple fastening means for fastening a diaphragm to the train sections and for permitting quick release of the diaphragm therefrom.

A still further object of this invention is to provide reenforced edges on a rubber diaphragm along the portions which are to be connected to the articulated train sections in such a manner as to distribute the stresses in the rubber substantially uniformly throughout the entire sheet of rubber used for the diaphragm.

Other objects of this invention will appear hereinafter as the description hereof proceeds, the novel features, arrangements and combinations being clearly set forth in the specification and in the claims hereunto appended.

In the drawings:

Fig. 1 represents an isometric skeleton view of adjacent ends of cars of a stream-line train connected by a diaphragm made according to my invention;

Fig. 2 is a section taken along the line 2—2 of Fig. 1 but with the diaphragm only partially applied to the train sections, and illustrating a step in the method of applying the diaphragm to the train sections;

Fig. 3 is a view similar to Fig. 2 showing a modified diaphragm construction and illustrating another method of connecting same to the adjacent sections of a train.

Fig. 4 shows a modified means for holding the diaphragm in place, the diaphragm being constructed substantially as in Fig. 2;

Fig. 5 is a plan view of the fastening means illustrated in Fig. 4;

Fig. 6 shows another form of fastening means for holding the diaphragm in place; and

Figs. 7, 8 and 9 show additional types of construction which may be used for the purpose of holding the diaphragm in place and in the construction of the reenforced edges of the diaphragm.

The ordinary type of railroad train has articulated sections connected by blinds which are of an accordion type arranged about the connecting passageways at the adjacent ends of articulated connected sections. These accordion-type blinds are arranged somewhat inwardly of the outer surfaces of the cars or articulated sections of the train and therefore there are constant eddy currents set up between the ends of the car sec-

tion which impede forward movement of the train.

The present invention has for its principal object the provision of a smooth, tensioned, flexible diaphragm substantially entirely surrounding the space between the ends of articulated sections of a train whereby when the train is in motion the air will flow smoothly past the joint between the articulated sections whereby when the train is moving around a curve the entire diaphragm will be kept taut to eliminate any air pockets in the stream-line contour of the train itself at the point of connection of the articulated sections. In carrying out this invention I preferably employ a sheet of rubber or some other water-proof elastic material, such as rubberized fabric, which will stretch at least in one direction, particularly in a direction parallel to the outer surfaces of the train sections. I will describe my invention as applied to a rubber diaphragm which has been found very practical in actual use. The diaphragm is composed of a single sheet of rubber adapted to surround the space between articulated sections of the train, at least at the upper and outer sides thereof. The rubber diaphragm is also preferably provided with means cooperating with suitable fastening means for distributing the tension in the diaphragm uniformly throughout its entire area under normal conditions. The diaphragm is tensioned for the purpose of keeping the same taut at all times, even when the train is rounding the curve, so as to prevent the formation of air pockets between articulated sections. The tensioning is not sufficient as to cause undue strain on the portion of the rubber section taking an increased stretch as the train rounds a curve.

I have illustrated my invention as applied to a stream-line train comprising at least a plurality of cars **20** which have articulated movement relative to each other and are connected by rubber diaphragm **24**, connected in the manner more particularly shown in Fig. 2.

The cars **20** have recesses **22** at the ends to be connected by the rubber diaphragm and these recesses form abutments **23** arranged peripherally of the ends of the cars for a purpose which will appear presently. A rubber diaphragm **24** made of relatively heavy rubber stock has the edges thereof reenforced by relatively stiff fabric strips **25** made up of layers of fabric such as in an ordinary rubberized belt construction. This reenforcing strip **25** has a substantial width, although its thickness is not so great as to prevent the same from being rolled up with the diaphragm in the direction of the length of the diaphragm. Thus, the diaphragm may be rolled up into a compact bundle which enables one to ship the diaphragm in a relatively small container or as a relatively small package.

As is clearly illustrated at the left in Fig. 2, the reenforcing strip **25** has the edge of the rubber diaphragm united thereto permanently as by vulcanization on one side only of the reenforcing strip. This is for the purpose of facilitating the application of the diaphragm to the ends of cars.

In applying the diaphragm to the adjacent car ends one reenforced edge of the diaphragm is arranged in one of the recesses **22** in the manner illustrated at the right in Fig. 2, with a portion of the rubber diaphragm not vulcanized to the reenforcing strip lying against the side of the reenforcing strip opposite to that side of which the diaphragm is united. A metal clamping strip or lug **26** is used for the purpose of clamping the edge of the diaphragm in place. This clamping means may be either a lug or a continuous section substantially of the same shape as the outer periphery of a car end or comprising a series of strips. For instance, one section of the strip may be made long enough to embrace the upper side of the car and two other strips be made of a sufficient length to embrace the sides of the car. The clamping means **26** is angular in cross-section and has a leg **27**, the lower edge of which is adapted to contact with the bottom of the recess and has a diaphragm-clamping portion **28** adapted to overlie the diaphragm to hold the latter securely in place. A series of screws **29** are used to hold the clamping means **26** in place and a rubber strip **30** is placed between the claimping portion **28** of the clamping means and the adjacent surface of the diaphragm. This clamping means is constructed in this manner so that when tension is exerted on the diaphragm the rubber strip **30** will give somewhat and distribute the stresses set up by the tension of the diaphragm substantially uniformly over the area of contact between the rubber strip **30** and the diaphragm and the area between the reenforcing strip **25** and the rubber diaphragm. This adds considerable to the length of life to the diaphragm and prevents the tearing of the diaphragm along the line where the diaphragm is permanently connected to the reenforcing strip. After one edge of the diaphragm is connected to an end of a car **20** the diaphragm is ready to be attached to the other car end and the diaphragm construction is such as to permit the ready application of this diaphragm to the other car end. Since the diaphragm must be connected to a considerable peripheral portion of the other car end shown at the left in Fig. 2, it is manifestly impractical to apply all portions of the edge of the car end simultaneously without the aid of special tools, as would be practically necessary were the reenforcing edge of the diaphragm of a substantially rigid piece or the like. The extreme free edge of rubber diaphragm shown at the left is placed in such a position as to contact the bottom of the groove. This may be done without stretching the diaphragm or at least not stretching it appreciably. The operator then merely has to press downward and then to the left on the rubber diaphragm and reenforcing strip to position the edge of the diaphragm and the reenforcing strip in at the left in the same position as illustrated at the right in Fig. 2. Since the reenforcing strip is flexible the diaphragm may be gradually worked to the left, beginning at one end and working to the other end of the groove or starting at some other portion and working in the opposite direction toward the end of the groove. If desired, instead of forcing all portions of the strip into the groove before applying the clamping means, the first portion of the strip which is forced into the groove may be clamped thereto as by a clamping lug, such as shown at the right in Fig. 2 to prevent the diaphragm from moving out of its operative position and similar lugs may be connected as additional portions of a reenforced edge are forced into the groove. In other words, by uniting the rubber diaphragm to one side only of the reenforcing strip, applicant is able to obtain a camming action which permits the application and tensioning of the rubber diaphragm

without the necessity of employing special tools for those purposes. After the diaphragm is in place, it is obvious that the outer surface thereof is substantially flush with the outer surfaces of the car ends and, of course, if desired the ends of the cars may be recessed more than illustrated so as to bring the diaphragm even more into alignment with the outer surfaces of the car ends.

The tensioning of the diaphragm is sufficient so that as the cars move around a curve in the road the portion of the diaphragm on the inside of the curve, while losing some of its tension, will not necessarily lose all of its tension and will be kept taut, thereby maintaining the stream-lining of the train at all times.

In Fig. 2 I have illustrated a modified form of my invention wherein the car ends are illustrated the same as in Fig. 1, and similar clamping means used. However, in this form of the invention the edges of the rubber diaphragm are doubled back upon themselves, as at 31, to form a reenforced edge having a portion adapted to abut against the respective abutments 23 on the car ends. Additionally, the edges of the rubber diaphragm could have a reenforcing element such as 25 shown in Fig. 2. The clamping means 26 is similar to that illustrated in Fig. 2 and the rubber strip 30 is also similar to that illustrated in Fig. 2 and these parts function substantially the same as in Fig. 2. In this instance, however, it is necessary that the rubber diaphragm be stretched otherwise than by a camming action, such as illustrated in Fig. 2, and this may be done either manually, if sufficient force can be applied thereto, or mechanically by suitable diaphragm-stretching means.

In Figs. 4 and 5, I have illustrated a still further modification of my invention in which the abutment 23 is formed as a separate piece and preferably permanently united to the car end 20. The diaphragm is constructed the same as in Fig. 2 and is provided with a rubber strip 30 similar to that shown in Figs. 2 and 3 and adapted to perform a similar function. The clamping means differs somewhat. In this form of the invention an angular piece 32 embraces the outer edge of the rubber strip 30 and holds the rubber strip and diaphragm edge securely in place. A rotatable lug 33 having a projecting portion with a cam surface 34 on the underside thereof is carried by a bolt 35, and when the cam is in the position shown in Figs. 4 and 5 with the nut 36 on the bolt tightened to hold the lug 33 in place, the angular strip 32 is securely held against displacement from the position shown in Fig. 4. Of course it will be understood that the other side of the diaphragm may be similarly united to the adjacent end of an adjacent car in a similar manner or it may be connected in any other manner, such as shown in Figs. 2 and 3.

In Fig. 6 the reenforcing element 25 is completely embraced by the edge of the rubber diaphragm and is preferably permanently united to the opposite sides of the reenforcing element, as by vulcanization. A member 37 attached to the outer peripheral edge of the car end has an abutment 38 formed thereon and an outwardly projecting portion 39 having a portion 40 extending in a direction substantially parallel to the side of the car, thereby forming a recess 41 adapted to receive the tail portion 42 of a clamping means 43 which may be in the form of a lug, as in Fig. 5, or as a continuous strip. A portion 44 of the lug 43 is adapted to abut against a portion 45 of the outwardly extending portion 39 to prevent counter-clockwise rotation of the clamping lug 43. Thus, by this means, the clamping lug 43 is operatively held in position without special clamping means.

Fig. 7 shows a modification of my invention similar to that illustrated in Fig. 7 in which the member 37 has a projecting portion 46 under which the tail piece 47 of the clamping lug 48 is inserted to prevent outward movement of the lug. To prevent rotation of the lug in a counter-clockwise direction a block or strip 49 having opposite V-edges 50 is forced in between the portion 39 of the member 37 and the adjacent portion of the lug 33, which portions are provided with complementary V-grooves to receive the V-edges of the clamping block or strip 49.

In Fig. 8 I have shown a still further modification of my invention, similar to that shown in Figs. 6 and 7, in which an abutment is formed at the edge of a car end and in which the diaphragm is constructed similarly to the way it is constructed in Fig. 2. The side of the car is provided with a member 50 having a peripheral recess 51 in which the tail piece 52 of a clamping lug 53 is arranged. This tail piece abuts against a shoulder 53 on member 50 whereby to prevent movement of the clamping means 53 to the right. A wedge block 54 similar to that illustrated in Fig. 7 at 49 is wedged in between member 50 and adjacent surface of clamping lug 53, the wedge block being formed with a projection 55 adapted to be received within a complementary groove in the clamping means 53, thus special clamping screws and the like are eliminated, and the outer appearance of the train is greatly improved by the absence of outstanding clamping means such as that shown in Figs. 2 and 3.

In Fig 9 I have shown a form of my invention in which the diaphragm 24 is provided with reenforcing strips 56 on opposite sides thereof, these strips being substantially triangular in cross-section. A peripherally arranged abutment member 57 has an outer tapered seat against which the adjacent portion of the reenforcing strip 56 abuts. The clamping means 58, formed similar to clamping means 26 in Fig. 2, is held in place by a series of screws or bolts 59, the edge of the clamping portion of the clamping means 58 being bent inwardly, as at 60, to form a tapered seat on the inner surface thereof adapted to contact the adjacent tapered portion of reenforcing strip 56. Both of the reenforcing strips 56 are preferably vulcanized or otherwise permanently united to the rubber diaphragm. This prevents the diaphragm from being pulled out from between the strips if the clamping means becomes loose. Furthermore, by the use of flexible reenforcing strips 56 the rubber diaphragm is capable of yielding more than where rigid reenforcing means is used, although my invention contemplates the use of that type of reenforcing means as well as a flexible reenforcing means. If desired an enlarged edge on the rubber diaphragm may be formed by embedding a reenforcing strip in the edge of the rubber during the vulcanization of the rubber to give the edge a cross-section substantially that illustrated in Fig. 9. This may be accomplished by shaping the reenforcing strip so that it is angular in cross-section and embedding the same in the edge of the rubber with substantially equal quantities of rubber on all sides of the reenforcing strip. However, this construction has the disadvantage of requiring special molds and op-

eration. With the invention shown in the other views the vulcanization of the rubber strip to the edge of the diaphragm is a very simple problem.

While I have illustrated the diaphragm as being permanently connected to the reenforcing strips, nevertheless it is within the scope of my invention not to permanently unite these parts, as it is apparent from an inspection of Fig. 1 that the same could be attached to the ends of adjacent cars without the necessity of having the parts vulcanized to each other, although this arrangement would probably not be as easy to install and, therefore, it is preferred to vulcanize the parts to each other in the manner set forth. Of course it is to be understood that any other fastening or reenforcing means be used for uniting the edge of the diaphragm without departing from the spirit of the invention, also the abutments **23** may be formed as separate pieces and secured to the outside of the car ends, as might be done in adapting my invention to car ends which were not originally equipped with recesses, such as **22**. Furthermore, the recesses **22** may be made deeper than illustrated to increase the stream-lining of the train and in this event the abutments **20** would be made of lesser height, as would be obviously necessary, in order that the same would not cause outward bulging of the diaphragm **24**.

It will also be understood that other means may be employed for clamping strips or lugs **32** etc., in place without departing from the spirit of the invention. The principal object of the securing means should be to firmly hold the edges of the diaphragm while permitting an appreciable amount of yielding of the diaphragm at the point where the same is clamped so as to increase the life of the diaphragm and to distribute the stresses in the diaphragm uniformly throughout the same.

I am aware of the fact that rubber diaphragms have been used to stream-line a train by enclosing the space between adjacent car ends but it is believed that the invention herein disclosd is novel in that it provides a simple and efficient means for holding the diaphragm in place while permitting a rather uniform distribution of the tension forces throughout the entire area of the diaphragm. Furthermore, by tensioning the diaphragm initially but not to too great an extent, the diaphragm will always be maintained in a taut condition to insure the stream-lining of the train at all times, even when the train is moving around a curve or when the ends of the adjacent cars move upwardly or laterally relative to each other, as the train moves along the tracks therefor.

My invention is not necessarily limited to the particular construction shown in the accompanying drawings as the invention is applicable to other relatively movable sections of a train or the like and in which it is desired to connect the sections by such a yielding diaphragm, therefore the terms section or sections as used in the accompanying claims are not to be considered as limiting the invention to car sections. The sections are to be considered as any of the relatively movable sections of a train. It is obvious that the invention is applicable to other constructions than the adjacent ends of two cars. Obviously, those skilled in the art may make various changes in the particular construction and arrangement of the parts without departing from the spirit of the invention set forth herein and, therefore, I do not wish to be limited in my invention except as hereinafter set forth in claims hereunto appended.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent of the United States is:

1. In a train or the like construction the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses.

2. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses, said diaphragm being under appreciable initial tension.

3. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses, said clamping means comprising an angle bar, one leg of which engages the side of said train section and the other of which overlies the outer surface of said diaphragm.

4. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm, having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses, said clamping means comprising an angle member having a portion engaging the side of the train section and another portion overlying said diaphragm and including a yieldable member arranged between said last-mentioned portion and said diaphragm to permit yielding of the diaphragm relative to the clamping member.

5. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm, having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses, said clamping means comprising a member having a portion adapted to overlie the outer surface of said diaphragm and hold the same against the side of

the train section and a portion engaging the car section, and a wedge block adapted to engage said clamping means and having a portion engaging said last-mentioned portion of said clamping means for moving said first-mentioned portion of said clamping means against the outer surface of the diaphragm to hold the latter securely in position.

6. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are recessed peripherally substantially parallel to their ends to form abutment surfaces adjacent their ends, of a flexible diaphragm, having means at the opposite edges thereof arranged within the recesses of the respective sections and abutting against said abutments, and clamping means for holding said portions of said diaphragm in operative position within said recesses, said clamping means comprising a member having a portion adapted to overlie the outer surface of said diaphragm and hold the same against the side of the train section and a portion engaging the car section, and a wedge block adapted to engage said clamping means, and having a portion engaging said last-mentioned portion of said clamping means for moving said first-mentioned portion of said clamping means against the outer surface of the diaphragm to hold the latter securely in position, and said second-mentioned portion of said clamping means having means cooperating with an abutment on the side of said train section to prevent outward movement of said clamping means away from said train section.

7. In a train or the like construction having relatively movable sections having spaces between the ends of adjacent sections, of a flexible diaphragm having spaced abutment surfaces on the inside surface thereof facing inwardly toward the space between said car sections, abutments on the outer surfaces of the ends of the car sections facing away from each other and against said facing abutment surfaces on said diaphragm abut, and clamping means for holding said diaphragm in position with said abutment surfaces against said abutments, said clamping means comprising a non-yielding member, a yielding member between said non-yielding member and said diaphragm and clamping means for holding said non-yielding member firmly against said yielding member and diaphragm to hold the same in operative position.

8. In a train or the like construction, the combination with spaced relatively movable sections, the outer surfaces of which are provided with abutment surfaces thereon facing away from each other, of a flexible diaphragm having abutment surfaces at the opposite edges thereof facing inwardly toward each other, and adapted to abut respectively against the abutments on said sections, and clamping means for holding said abutments in operative relation with respect to each other, comprising an angle bar for each edge of said diaphragm, one leg of which engages the adjacent train section and the other leg of which engages the outer surface of said diaphragm, and means for holding said angle bar rigidly against movement outwardly away from said train section.

9. In a train or the like construction having a plurality of sections, each of the opposed ends of said sections being provided with an abutment surface facing in a direction away from the other of said sections, the combination with said sections of a flexible and stretchable diaphragm bridging the space between said sections and having an abutment surface at each of the opposite edges thereof, the latter abutment surfaces facing toward each other, one such abutment surface engaging the abutment surface on one of said sections and the other engaging the abutment surface on the other of said sections to form two pairs of engaging abutment surfaces, separate and independent clamping means for each pair of engaging abutment surfaces to hold them in cooperating engagement with each other, but leaving the portion of the diaphragm intermediate the clamped portions thereof unrestrained to stretch in the general direction of the length of said train, said abutment surfaces on said diaphragm being formed by a doubled-back edge portion of said diaphragm and a strip of reenforcing material secured only to said edge portion, said strip being relatively stiff against bending in a plane parallel to the diaphragm, but flexible laterally to permit conformity to the contour of the sections with which the diaphragm is used.

10. A device as set forth in claim 9 in which said strip of reenforcing material is arranged between the doubled-back edge portion of said diaphragm and the body of said diaphragm, but in which the strip is only secured to the doubled-back edge portion and not to the main body of said diaphragm.

11. A device as set forth in claim 9 in which there is a strip of yieldable material positioned between said diaphragm and the clamping means.

12. In combination with relatively movable sections of a train or the like, the combination with said sections of abutments on the peripheral surfaces of adjacent ends of said sections having abutment surfaces facing away from each other, of a rubber diaphragm overlying said abutments and doubled back upon itself inwardly of said diaphragm to form abutment shoulders adapted to abut against said abutment surfaces, reinforcing strips of relatively non-compressible but flexible material are arranged between the doubled-back portions of said diaphragm and the main body of the diaphragm to reinforce the edges thereof, and clamping means for holding said diaphragm with said abutment shoulders against said abutment surfaces, comprising means overlying the outer surface of said diaphragm and rigidly held in position against movement away therefrom for positively holding said abutments against movement out of operative relation with each other, said reinforcing strips being permanently united only to said doubled-back portions of said diaphragm.

WILLIAM C. POTTHOFF.

CERTIFICATE OF CORRECTION.

Patent No. 2,269,685. January 13, 1942.

WILLIAM C. POTTHOFF.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 5, first column, line 42, claim 7, after "against" insert --which--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D. 1942.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)